A New Technology Standard To Narrow the Digital Divide

The L.1700 standard can help support rural communications in developing countries – and perhaps in the United States as well.

By Pavan Shakya / *FibNet*

In 2016, the International Telecommunication Union (ITU) developed L.1700, a technology-neutral recommendation that places priority on the affordability of a low-cost, sustainable telecommunications infrastructure solution for rural communications in developing countries. It recommends that the reliability of the solution be the most important attribute after affordability.

L.1700 builds on established technologies to identify the founding principles for broadband backhaul infrastructure. It provides the framework for technology-specific standards, such as L.110, which covers fiber optic cables.

Local communities and village development councils will be able to corral resources – that is, minimally trained human resources – to lay these cables with partial burial techniques or place them securely just beneath the ground surface along rivulets, on river banks and across tree trunks and to relocate, rewire and repair them with ease.

The following information is based on FibNet's experience using L.1700-standard fiber optic cables in Nepal, but I believe this technology holds promise for rural areas worldwide, including in the United States.

AN ADAPTABLE DESIGN

Many buildings and office structures scattered across Nepal do not comply with international building standards. They certainly do not qualify as earthquake resistant (seismic aware) structures. Many of these will be torn down and replaced in the near future – which means that any telecom cables laid to connect the buildings could potentially be stranded.

However, L.1700 provides for an adaptable network architecture design because the cables can easily be physically rerouted between buildings and other locations within any community. Such rerouting would be cost-prohibitive if a deployer used traditional fiber cables. Moving traditional cables is labor and machine intensive and limited by terrain and weather.

The Nepali communities we have initially targeted face multiple challenges, including lack of access to basic health care, lack of academic institutions, season-dependent transportation and extremely poor communications infrastructure. The federal government is generally apathetic about addressing these challenges.

A low-cost, simple, DIY solution can transform entire communities. Cable and computing device installation jobs will appear, technical trainers will be required, local businesses such as honey producers will have access to markets beyond their limited borders, and there will be a sudden burst of commercial and academic activity. Banks and other financial institutions will be willing to give out loans more easily.

Those who know Nepal even minimally will by now be shaking their heads. Why? I have

yet to mention the hidden jewel that Nepal and Nepalis hide so unwittingly: the beauty of its land. Nepal is a destination for adventure sports (river sports, biking, hiking, camping, skiing and more), for pilgrimage (ancient monasteries and temples) and for locally handcrafted artifacts. Broadband can help these business enterprises by making them more accessible. Travelers who can more easily obtain directions, room reservations, transportation and information about Nepal will be more likely to visit and buy goods there.

A low-cost, robust internet connection can transform this land and the way its businesses run. From being an LDC (least developed country), Nepal can easily jump onto the developing nations bandwagon.

L.1700 obviously does not and cannot provide the mechanisms of sustaining growth and the initial levels of enthusiasm. Although there

Villagers in the Himalayan country of Bhutan install fiber using DIY methods.

An aerial installation of L.1700 fiber in Bhutan makes use of a conveniently located tree.

will be success stories, pitfalls and new challenges will appear. This is unavoidable. However, the fact that L.1700 is a DIY technology means that local community leaders and the public will remain involved in the minutiae of network maintenance, security, deployment, training and so forth. This will help people capitalize on the initial burst of activity and eventually ensure that one of their major economic drivers – telecommunications infrastructure – remains functional and utilized at capacity.

In L.110, ITU standards experts have put forward a solution expressly targeted at narrowing the digital divide, providing the groundwork for local optical cable installation, maintenance, security and repair.

WHY L.1700 IS BETTER THAN CONVENTIONAL FIBER SOLUTIONS

Two singular features of L.1700 and its supplements are the ease of deployment and the short learning curve of the "technicians." There is no requirement for deep trench burial. Shallow burial or simple surface layout is sufficient.

The cable consists of a tenacious metal tube that protects optical fibers from on-surface disturbances, such as foraging animals. This cable has been deployed in commercial settings for the past 20 years, and more than 12,000 miles (20,000 km) of it have been deployed in the Japanese market.

The most affordable way of installing and maintaining this cable is to hire local community members. Installers can choose to lay the cable on the surface, direct bury it, submerge it in water or suspend it aerially, depending on the terrain, and they can relocate lines as necessary. The fiber is weather and terrain agnostic and does not need manholes or special underground pipes. Local community layout teams can work throughout the year in any terrain.

Deployers can find technology-specific best practices in supplement texts – for example, ITU-T L Supplement 22 specifies the design of a low-cost, terabit-capable optical cable that can be deployed on the ground surface with minimal expense and environmental impact. The L.110 optical implementation based on the L.1700 framework has proven to be reliable, robust and cost-effective.

Reliability is only the second most important attribute of L.1700. This reverses the common approach to fiber optic cable design – reliability is usually the primary focus, but with L.1700, affordable implementation is the top priority.

NEPAL ELECTRICITY AUTHORITY

The Nepal Electricity Authority is the only supplier of retail electricity in Nepal. Until recently, customers' only payment option was to stand in queue every month at local NEA offices. Tempers flared over parking, pushing and shoving was common and the tellers never seemed fast enough or interested enough to accommodate or ease the payment process.

The last few months have brought a revolutionary change. A third-party financial technology company started an online bill payment system for NEA, and the monthly surging crowds slowed to a trickle. The apathetic tellers now have bored expressions as they wait for their shifts to end, as if they almost miss the shouting, heckling and unwarranted comments from the crowds.

What will happen if this is replicated across Nepal? Is it possible? Can a villager who lives a three-day walk from the closest urban center afford to make a monthly trip just to pay his nominal bill? Millions of Nepalis face these real-life questions. The terrain is difficult, and the weather is unforgiving. When the two intersect – as when people need to cross near-flood-level rivers during the monsoon season – life is impossible. These difficulties weigh heavily on the rural psyche. With no life insurance, or any type of insurance, a typical villager makes countless life-threatening journeys over the course of his or her lifetime.

CAN L.1700 BE USED IN THE UNITED STATES?

In the United States, the Appalachian region might be a good candidate for L.1700 technology. Largely bypassed by the interstate highway system, the region has suffered economic depression over several generations. Despite the efforts of the Appalachian Regional Commission, much work remains to bring Appalachia up to par with rest of the country.

Appalachia lacks a robust telecommunications infrastructure, resulting in loss of economic power, academic opportunities, medical services

and leisure and recreational offerings in this visually stunning, physically demanding, naturally blessed region.

The lack of high-speed broadband services has kept the region from attracting technology-sector jobs and businesses. However, the digital divide is no longer confined to the tech sector. Every industry now requires high-speed, reliable internet access for growth. Local businesses of all kinds are deprived of opportunities to compete elsewhere when they are not able to access information and business openings.

Internet access is not the only measure that development consultants should consider. It is equally essential that access to high-speed internet services be available at a reasonable cost. Informal interviews with local leaders indicate that the Appalachian region lags the rest of the United States in terms of affordability of high-speed internet services. This is even more acute for individuals and small businesses.

Obviously, steps must be taken to build local capacity in any attempt to bridge a digital divide.

Reinforced DIY fiber cables could mitigate the capex burden that keeps providers from serving sparsely populated rural areas. These waterproof cables do not require burial, are mostly immune from foraging animals, and can be strung across treetops and immersed in water if the need arises. The semimountainous landscape of Appalachia is similar to the hilly regions of Nepal. Robust cables will prove to be a game changer in expanding high-speed internet service delivery in Nepal; perhaps this success can be replicated in rural and small-town America as well.

SUMMARY

L.1700 cannot fix flooding rivers, nor can it provide life insurance, but it can allow remote, minimally internet-savvy users to pay their bills, read the news and access online education for themselves or their children. We must do what we can do.

With the internet will come demand for trainers, sellers, repair persons and other skilled workers, giving fiscally challenged regions a fighting chance to stand up once again. Nepalis are proud people. They don't want a dole; they need an opportunity to forge their own destiny. L.1700 can provide the communications layer underpinning opportunities for new commercial activities, educational access and health care delivery. ❖

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